# LOG SCALING

Log scaling is the measurement of the **board foot volume** of a log. **One (1) board foot** is equal to a 12-inch by 12-inch board that is one (1) inch thick. Idaho uses the **Scribner Decimal C Log Rule** that estimates the number of board feet that can be cut from a given log.

Two (2) measurements are needed to determine the board foot volume of a log. The length of a log is measured in feet and the diameter of the *small* end of the log is measured in inches.

The principal tools needed to determine the board foot volume of a log are either a **log scale stick**, or a **log rule table** used in conjunction with a **measuring tape**. A log scale stick simplifies scaling because it combines both a measuring stick and a table of log volumes. Divisions on the log scale stick are to the one-half inch, so no rounding is needed.
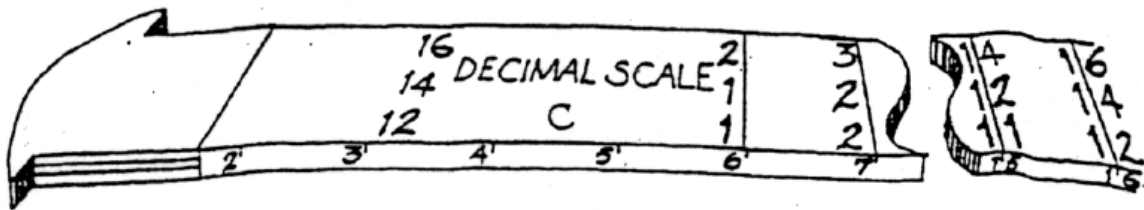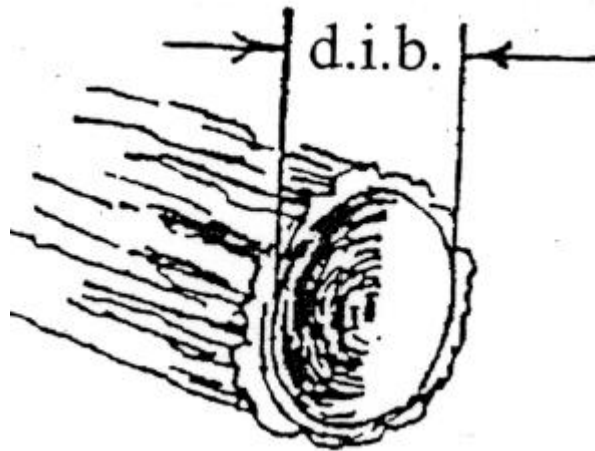

Several important guidelines must be considered in making these measurements:

MEASURING THE DIAMETER OF A LOG

→ Remember to measure the diameter of the *small* end of the log.
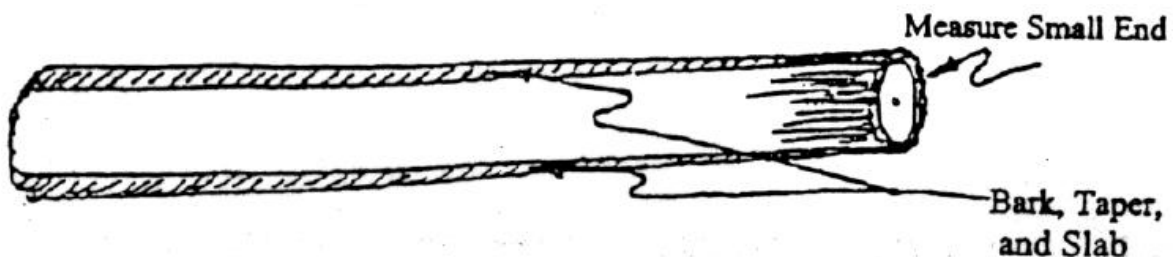
➔The diameter of the log is always measured *inside* the bark. This measurement is called **"*diameter inside of bark*"** or ***d.i.b.***

➔The ends of all logs are not circular. On oval-shaped logs, the diameter is determined by averaging the short measurement and long measurement, taken at 90 degrees from the short measurement. Both measurements are taken through the center of the log.
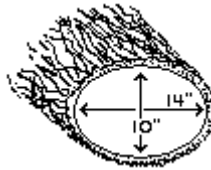
$$\frac{10+14}{2} = 12$$

➔***Sawlogs*** (except for "***peelers***") are measured in even two (2) foot lengths up to a maximum scaling length of 20 feet (20'). For longer lengths (22' to 40'), the logs are scaled either as two segments of equal length (e.g. 32' = 16' + 16') or as two unequal segments with the butt segment the longer by two feet (e.g. 26' = 12' top + 14' butt segments). The most common lengths are 8', 16', and 32' (although a log could be 10', 12', etc.). A 32' length log is scaled as two 16' segments.

➔Logs are usually cut a few inches longer than the length specified by the sawmill. This extra length is called ***trim allowance***. In other words, a 16-foot log will be somewhat more than 16 feet long. For example, a 16 foot log may actually measure 16'6". Trim allowance will vary according to sawmill specifications, but 6 inches per segment is standard.

➔To measure a log's ***diameter inside of bark*** (d.i.b.), a log scale stick or simply a yard stick can be used to measure the d.i.b. at the small end of the log. The log length is usually measured using a ***logger's tape***, but any measuring tape can be used. A logger's tape is faster and more convenient, however.

→After measuring d.i.b. (at the small end) and log length, refer to a **Scribner Log Rule Table** to calculate the board foot volume of the log. A Scribner Decimal C Log Rule Table is illustrated below:

SCRIBNER DECIMAL C LOG RULE TABLE						
Log Length (feet)						
d.i.b	**10**	**12**	**14**	**16**	**18**	**20**
6	1	1	1	2	2	2
7	1	2	2	3	3	3
8	2	2	2	3	3	3
9	3	3	3	4	4	4
10	3	3	4	6	6	7
11	4	4	5	7	8	8
12	5	6	7	8	9	10
13	6	7	8	10	11	12
14	7	9	10	11	13	14
15	9	11	12	14	16	18
16	10	12	14	16	18	20
17	12	14	16	18	21	23
18	13	16	19	21	24	27
19	15	18	21	24	27	30
20	17	21	24	28	31	35
21	19	23	27	30	34	38

To determine the **board foot volume of a log** using this table, move your finger across the row from the d.i.b. (10 inches, for example) and down the column from the log length (20 feet, for example) to the point where they intersect (at 7).

NOTE: The log table shown above is a **Scribner Decimal C Log Rule Table**. The words "Decimal C" mean that all board foot volumes shown in the table should be multiplied by ten (10). The simplest way to calculate board foot volumes using the Decimal C log rule is to add a zero (0) to all of the board foot volumes given in the table. Therefore, using the Decimal C table above, a log measuring 10 inches d.i.b. and 20 feet in length has a volume of 70 board feet (10" d.i.b. x 20' length → **70 bf**).

EXAMPLE A - Suppose that you measure the d.i.b. of a log at the small end, and it is 10 inches. The log measures 16'6" in length. What is the board foot volume of the log?
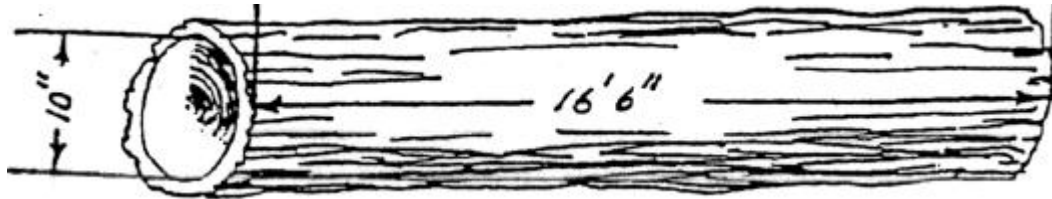
Here is the procedure to follow, using the log rule table:

1) Starting at the top, look down the d.i.b. column until you find the proper diameter inside of bark (d.i.b.). In this example, it would be 10.

2) Next, follow across the top row of numbers until you find the proper log length.
   In this example, it would be 16 (with standard trim allowance).

3) Now, go across the row corresponding to d.i.b. 10" and down from the 16' length to the intersection of the row and column. In this case, the answer is 6.

4) Add a zero to that answer to get the correct log volume of **60 board feet**.

EXAMPLE B - In this example, the d.i.b. measurement is 17 inches and the length is 12'6". What is the board foot volume of this log?

The correct answer from the table is 14. Remember, this number is the Decimal C volume, so it should be multiplied by 10 to give the actual board foot volume. Therefore, the correct log volume is **140 board feet**.

LOG DEFECT

The procedure described above for determining board foot volume assumes that the log is completely straight and the entire log can be used to manufacture lumber. In reality, logs are sometimes crooked or contain decay that makes a portion of the log unusable for lumber. This unusable portion is called *defect*. The amount of defect measured and deducted is based on one's forestry knowledge and experience. It is not within the scope of the Forestry Contest to be able to accurately measure defect. Therefore, students should only be concerned with the ability to measure the volume of logs with no defect.